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ABSTRACT

A final segment of the Montana research effort on agri-business manpower, this report summarizes the methods involved in and the conclusions and recommendations resulting from a study to develop an economical, efficient, and effective method of assessing current and anticipated agri-business employment opportunities and educational needs in Montana. Data were obtained from questionnaires mailed to agri-business throughout the State. Fifty-seven percent of the agri-businesses responded to the survey as a result of a first and second mailing and personal contacts. Findings will determine the allocation of future funds to agriculture education in the State. The following recommendations were made as a result of experience gained in this survey: (1) Procedures for such studies should be further refined; and (2) Funds should be allocated for the maintenance of up-dated files on agri-business employment. Related documents are available as VT 017 462-017 465 in this issue. (SN)

Agri-business Manpower Project Manual

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AGRI-BUSINESS MANPOWER PROJECT MANUAL

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The work presented herein was performed by the Montana Agricultural Experiment Station and supported by the Office of Superintendent of Public Instruction, Division of Vocational and Occupational Skills

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PREFACE

Agricultural educators in Montana are very much aware of the rapid technological change that is taking place in the agricultural sector of Montana's economy. The myriad of new and changing agri-related occupations that have been the result of this change has made it necessary to maintain a more accurate account of actual and anticipated employment opportunities in order to develop efficient and effective training programs.

The "band aid" approach which has characterized efforts to date has been replaced by an articulated procedure in which the key concepts are cooperation, flexibility, comprehensiveness and continuation. This manual was prepared to describe the general procedure followed in completing Phase I-A of the agri-business segment of a survey to identify Montana's agri-business employment opportunities.

This publication was prepared by the Department of Agricultural Education, Montana State University.

Acknowledgment is given to The Montana Chamber of Commerce and the members of the staff from The Vocational and Occupational Skills Component and the Research, Planning, Development and Evaluation Component of the Office of the Superintendent of Public Instruction who supported the survey.

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INTRODUCTION

A perusal of agricultural history will convince even the most skeptical that technological change has occurred faster in agriculture than in most other industries. At the time of the Civil War the American farmer fed himself and three others. A century later the average American farmer was able to meet his own food needs and those of eleven of his city cousins. Today he feeds and clothes himself and over forty other people and it is predicted that by 1980 he will be feeding a total of 65 persons.

Each year, even with population increases, it takes fewer agricultural producers operating larger farms and ranches to feed the American people. This fact, taken alone could lead one to believe that career opportunities no longer exist in agriculture. However, there is a tremendous need for highly skilled and highly trained persons in occupations directly related to production agriculture.

In 1969, the Director of Resident Instruction for the University of Arizona, College of Agriculture, reported that six persons are needed in agri-business for every person on the farm or ranch. The jobs which are being inferred exist in service-producing industries in areas of wholesale and retail trade, transportation, communication and finance. Technological advance in agriculture has resulted in growing opportunities for jobs in the farm-service sector of agriculture. Properly trained people are needed in these jobs to help the American farmer continue to be highly productive.

The change in the type of employment in agriculture has, in addition to creating new jobs, brought concomitant changes in the nature of existing employment. Specialization is the vogue of the day.

A REPORTING SYSTEM

Identifying agri-businesses throughout the state of Montana is a time consuming activity. A more formidable task is to develop a system that will generate employment data which can be translated into program objectives suitable for preparing an adequate number of trained employees. However, it seemed necessary to complete these tasks before taking steps to modify existing educational programs or introduce new propgrams to meet the needs of the future.

Data about Montana's agricultural employment have been collected by different agencies under varying conditions and at different times over the past decade. In all cases these manpower surveys have dealt with only one area of the state or a single type of agri-business within the state. As a result, each effort has served a specific purpose but collectively they have not produced generalizable data.

THE PROPOSAL

In the spring of 1970, the Staff of the Department of Agricultural Education proposed to accomplish a statewide effort to determine the nature and extent of rural youth and adult educational and employment opportunities uniquely associated with agriculture. The proposed survey was viewed as a planned effort to gather data which would reflect a more precise picture of the educational needs and occupational opportunities available to rural youth and adults in Montana.

Separate segments of the project would evolve around the accomplishment of four major objectives:

1. To assess the nature of and extent of educational and employment opportunities for rural youth and adults engaged in or preparing to engage in agricultural or agriculturally related occupations.

2. To develop and demonstrate generalizable methods and procedures for developing formal and informal rural youth and adult educational programs of effective format to meet objectives derived from an analysis of the need for educational programs in agriculture in Montana.

3. To evolve guidelines for the utilization of an educational consortium to provide educational activities which will enable rural youth and adults in agricultural pursuits to acquire needed competencies.

4. To establish a design and mechanism for the dissemination, evaluation, adjustment and renewal of rural youth and adult educational programs in agriculture for Montana.

During the early stages of the planning process it became apparent that the magnitude of the objectives would dictate that the project be divided into separate but not mutually exclusive phases. Reports of similar research conducted in other states indicated it would be most logical to treat the agribusiness and producer segment of the total project as separate entities and to further divide each segment into phases (Appendix A). The estimated time schedule for the development and completion of the various phases was established after each phase had been divided into major tasks.

THE AGRI-BUSINESS SEGMENT OF THE PROPOSAL

The objectives of the original long range proposal were broken into specific sub-objectives to enable researchers to attack systematically the

problem of identifying agri-business employment opportunities and were as follows:

1. To determine the number of employees currently employed in agri-business firms.

2. To determine the number of current positions, the number of positions one year from now and the number of positions three years hence among agri-business firms.

3. To determine the skill levels in which vacancies exist among agri-business firms.

4. To determine the need for agricultural experience as a pre-requisite for satisfactory employment with agri-business firms.

5. To determine why current vacancies exist among Montana's agri-business firms.

PROJECT FUNDING

The original proposal was presented to the Montana Agricultural Experiment Station in June of 1970, to be considered as a part of the total experiment station research effort. After reviewing the objectives of the proposal it was felt that the manpower project did not fit the criteria which had been established for new research projects. In the spring of 1971, the proposal was submitted again for further consideration and after some modification was accepted and supported with special rural development funds. Sufficient monies were transferred to the Department of Agricultural Education to support a full-time research assistant and to take the initial steps in getting the manpower project underway.

A detailed accounting of the anticipated costs of conducting the project indicated that the Experiment Station support would not provide sufficient monies to initiate the entire manpower project during the first year. The project

coordinators met with staff members from the Office of the Superintendent of Public Instruction, the Director of Vocational and Occupational Skills and the Director of Research, Planning, Development and Evaluation Component to discuss the problem. As the result of this and subsequent meetings an additional grant was provided to the Agricultural Education Department through the Research, Planning, Development and Evaluation Component, Office of State Superintendent of Public Instruction, to furnish a complete analysis of all manpower data gathered through the research project. The combination of the two grants allowed the project coordinators to launch the entire manpower project as planned.

PROCEDURE

The procedure followed in completing Phase I-A of the Manpower survey of agri-businesses was dictated by the central purpose and specific objectives of the study. It was necessary to accomplish the following tasks in order to collect and analyze data pertaining to the study:

1. Review previous research and literature describing surveys of a similar nature.
2. Organize the staff, identify staff responsibilities and made preliminary plans for conducting the employment opportunities survey.
3. Identify existing agricultural groups, state advisory committees or other groups vitally interested in the data to be generated by the survey.
4. Determine the target population; locate sources of and secure access to the names of agri-businesses and develop a procedure for determining the final population and sample.

5. Develop and pretest an instrument suitable for collecting data needed to meet the specific objectives of the survey.

6. Develop the overall operating procedure and outline the specific techniques for conducting the agri-business employment opportunities survey.

7. Conduct the agri-business employment opportunities survey.

8. Tabulate and record data collected from the survey.

9. Analyze the survey data.

10. Publish and distribute the results of the agri-business employment opportunities survey.

REVIEW OF PREVIOUS RESEARCH AND LITERATURE

A review of related literature and research was conducted to determine the procedure followed by other states in the conduct of similar manpower studies. Requests were made of those states who had recently completed exhaustive manpower studies for copies of their project reports. Additional information regarding the development of such studies was obtained through the ERIC (Educational Resources Information Center) informational system, a current index of educational research prepared through the U. S. Office of Education and CRIS (Current Research Information System) prepared by the Science and Education Staff of the U. S. Department of Agriculture.

The review of these research efforts provided impetus for the establishment of a procedure which focused on a systematic method of obtaining data regarding Montana's agri-business employment.

Definition of Agri-Business Occupations

To minimize misunderstanding and give direction to the process of identifying present and anticipated agri-business employment opportunities the following definition for agri-business occupations was established:

> Occupations which evolve out of a blend of agriculture and business, and encompass a variety of services associated with the manufacturing and distributuion of farm equipment, fertilizers and supplies; the processing, storage, marketing and distribution of farm equipment, fertilizers ans supplies; the processing, storage marketing and distribution of farm commodities including food and fiber; and the conservation, preservation and use of our natural resources.

Identifying Agri-Businesses

A review of research from other states pointed up the difficulties researchers encountered as they attempted to establish an exhaustive list of businesses and service agencies which are agriculturally related. Washington (3, p.7), Arizona (1, p.6), and Oklahoma (4, p.6) utilized their vocational agriculture instructors in obtaining complete lists of agri-businesses in their respective states.

Washington (3, p.7), Arizona (1, p.6) turned to the yellow pages of the telephone directory to supplement lists supplied by the vocational teachers and to identify agri-businesses in those communities where there was no vocational agriculture program. Although most states found the telephone directory useful, California (5, p.27) found this method to be too cumbersome for a complete coverage of a large, highly populated county.

When available, states tended to rely on existing lists of agri-businesses in the compilation of the survey population. Nebraska (2, p.2) researchers

were given access to records from the IRS (Internal Revenue Service) and the State Tax Commission. Both Nebraska (2, p.2) and California (5, p.27) utilized records supplied by the Employment Security Division of the Department of Employment to identify the agri-businesses that hired one or more employees.

Instrumentation

The systems followed by the different states in developing instruments for gathering needed data showed signs of similarity. Each system reviewed was slightly different but generally speaking, the instrument or instruments were developed cooperatively by those who had a vital interest in the resultant data.

California (5, p.27) developed three separate instruments. The first instrument sought information about the firm itself while the second and third interview schedules asked selected employees questions about himself and the job he performed.

Likewise, Washington (3, p.7) utilized two survey forms. Form one identified the business and gathered job title information about employees needing competencies in agriculture. Form two sought detailed information about each specific job title. Arizona (1, p.7) followed a similar procedure, however, the second instrument contained a list of core competencies commonly needed by workers classified under different job titles.

Nebraska (2, p.2) and Arizona (1, p.7) utilized a multi-purposed instrument to obtain needed information about job clusters or groupings of job titles. Nebraska's (2, p.2) instrument was different in that it sought information about employment in all vocational areas.

Although each state appeared to be seeking the same type of information, the manner in which they chose to gather the information varied depending in large part on the size and diversity of the agri-business sector of the state.

Operating Procedure

The personal interview seemed to predominate as a procedure for gathering agri-business data. Oklahoma (4, p.6) teachers were organized into county teams while Washington (3, p.7) called upon their vocational agricultural teachers to volunteer to be interviewers.

Arizona (1, p.7) used trained interviewers in addition to agricultural teachers while Nebraska (2, p.2) and California (5, p.30) used only trained interviewers. It was interesting to note that California (5, p.30) selected and trained interview teams for each county in which their manpower study was conducted.

STAFF ORGANIZATION

The successful accomplishment of a statewide agri-business occupational census depends upon the establishment of a specific plan to reach explicitly stated objectives. Such a plan should include the personnel involved and

a carefully identified series of events which must occur before the project can be completed.

Proceeding upon this fundamental concept of project management the staff organized itself into a working team. An early decision had been made to separate the agri-business and agri-producer segment of the total manpower survey. Each of two project directors would take responsibility for the conduct of one phase of the manpower survey. In addition to the project directors it was necessary to engage the services of one full-time research assistant and one secretary to assist with the technical and clerical aspects of the study. When organizing the project staff it was necessary to identify specific tasks in order to balance the departmental research-teaching schedule, research and/or departmental costs and performances requirements.

The specific tasks to be accomplished were identified and built into a schedule of activities. This allowed the researchers to manage their time and resources and enabled them to schedule research activity to coincide with teaching and administrative duties. A more detailed PERT network would be helpful providing all available resources are known to the researchers prior to the time the research is to began.

Adequate communications were maintained through regularly held staff meetings. The joint effort on the part of the project directors, research assistant and clerical staff served to eliminate many of the misunderstandings associated with research procedure and measurably improved staff productivity.

INVOLVEMENT OF OTHER AGENCIES

An agri-business occupational survey should generate data which are of interest to a large and diverse audience. Since so many persons, educational institutions and agriculturally related organizations were interested in employment data a positive effort was made to solicit their assistance in developing the survey.

During the formative stages of the project the staff met with the Associate Director of the Montana Agricultural Experiment Station. It was discovered that a Western Regional Research Project was underway. The various experiment stations, through a consortium of Western States, had joined forces to carry out an extensive effort under the general title of "Improvement of Employment Opportunities and Earnings for Disadvantaged People in Non-Metropolitan Areas." The Department of Agricultural Education's effort to assess alternative educational and employment opportunities for rural Montana was accepted as part of the overall effort. Subsequent meetings of the Project Committee led to further refinement of the framework needed to coordinate the total research effort among all states involved. The data from the Montana study would receive greater visibility and would interface with data gathered from other states.

Various groups throughout Montana expressed interest in the agri-business phase of the manpower project. Groups such as the State Chamber of Commerce, Area Vocational Centers, Mountain Plains Regional Education Center, High School Vocational Agriculture Instructors, Montana Hardware Implement Dealer's Association, Grain Terminal Association (GTA), Farmers Union Central Exchange Inc., and Peavey Company expressed an interest in the project. The State Agricultural Agri-business Education Committee of the Montana State Chamber

of Commerce had, through the Agricultural Education Supervisor, had begun to seek ways to obtain information about the employment needs within the agricultural sector in rural Montana. A joint meeting with the Agricultural Education Supervisor of the Vocational and Occupational Skills section of the Office of Superintendent of Public Instruction, project coordinators and the members of the Agricultural Committee of the Montana Chamber of Commerce was held to discuss mutual concerns. It was evident that all groups were interested in the data which the project would generate. The members of the Chamber Committee pledged their support to the total research effort and agreed to keep in constant contact with both agencies, providing assistance as needed. In exchange for their assistance the State Chamber of Commerce would have access to data which would be of value to them in the conduct of their state program. Likewise, the Agricultural Education Service in the Vocational and Occupational Skills Component of the State Superintendent's Office agreed to assist Montana State University researchers with the project.

For purposes of professional communications the project coordinators met with personnel from the Research, Planning, Development and Evaluation Component of the Office of the State Superintendent of Public Instruction to discuss the manpower study and seek assistance in monitoring the agri-business manpower survey.

To avoid possible duplication of effort, members of the departmental research staff contacted other state agencies which might have employment data readily available. Although fragmented data about employment opportunities did exist the detailed data needed by program planners to develop new training

programs were not available. For example, data from the State Employment Security Commission focused on only the production aspect of agriculture and did not separate employment in agri-business from total employment opportunities.

In the initial project proposal, it was implied that an accurate accounting of agri-business employment opportunities and specific job competencies would lead to the establishment of specially designed educational programs. Federal monies became available early in 1972 to establish pilot programs which would focus on total career education in the local high schools.

Several proposals were submitted but it was considered expedient by the staff of Research, Planning, Development and Evaluation Component of the Office of the State Superintendent of Public Instruction to direct the entire effort toward designing a single substantive pilot program which would involve a large number of high schools and utilize all available career information.

In February, 1972, a contract in excess of $35,000 was finalized between District No. 1 and the Great Falls Vocational Technical Center for a developmental project which would evolve around the career education concept. A career awareness coordinator (CAC) was employed to coordinate the project, the purposes of which were to:

1. Establish programs founded on research of manpower and student needs in Montana concentrating in the agricultural related areas.
2. Provide students with accurate information regarding these needs.
3. Provide training and placement to fill those needs.

The program would utilize all available research material to identify approaches, techniques and materials which would enhance the counseling procedure

for developing career awareness among students from grades 10 to 14 in secondary schools of Great Falls, Belt, Simms, Cascade, Fairfield, Fort Benton and the post-secondary section of the Great Falls Vocational Technical Center. The Montana State University Agricultural Education Department agreed to furnish data gathered from the manpower study to the project coordinator through the Office of the Superintendent of Public Instruction.

DETERMINING THE POPULATION

Budget limitations prompted an early decision to gather the initial data from Montana agri-businesses through a mailed questionnaire. A further decision was made to seek only information relative to present and predicted job vacancies in Phase I-A of the study. In Phase I-B a smaller group of agri-businesses would be sampled to assist in identifying specific job competencies needed in the respective job titles. Finally a decision was made to request information from all Montana agri-businesses that could be identified.

Obtaining the complete list of names and addresses of agri-businesses in a state even as sparsely populated as Montana is not accomplished without difficulty. Originally it was thought that the population could be identified from existing lists that would be available from one or more state agencies. It was found that such lists did not exist or were not available for general consumption. A decision was made to solicit help from specific groups and organizations throughout Montana.

The Secretary of the State Chamber of Commerce agreed to contact individual community chambers and request a list of agri-business in their

community (Appendix B). At the same time, a request was made of each vocational agriculture instructor in the state for a similar list from his community (Appendix C). County agents were asked to assist in those communities where a Chamber of Commerce did not exist or where there was no vocational agriculture department. A review of the agri-businesses whose names and addresses were obtained by the aforementioned methods revealed that a number of Montana communities were not represented. In such cases the names and addresses of the agri-businesses were obtained from the yellow pages of the community telephone directories. The names and addresses of 2,213 agri-businesses were obtained. It was impossible to say that the master list included all of the agri-businesses in Montana but for purposes of the survey those agri-businesses identified were considered to be the total study population.

Once identified, the firm's name and address were keypunched on a computer card in such a way that an address label could be printed by the computer. This step greatly facilitated the mailing process. All computer cards were to be retained by the Department of Agricultural Education in order that additional lists could be prepared to facilitate subsequent research efforts.

Obtaining a complete list of the names and addresses of all agri-businesses concerned is probable the most critical part of any manpower survey. Every source of information should be utilized to obtain the correct name and complete address of every agri-business. Special precautions should be taken to avoid duplication.

THE DEVELOPMENT OF A QUESTIONNAIRE

One of the most critical decisions to make regarding any survey instrument relates to the kind and amount of information that will be gathered. Following several meetings with representatives of the Research, Planning, Development and Evaluation Component of the Office of the Superintendent of Public Instruction and the Agricultural Committee of the State Chamber of Commerce a decision was made to gather only information which was directly related to present and projected employment needs among the agri-businesses throughout the state. The rationale for collecting a limited amount of information with the survey instrument was that a sample of agri-businesses would be contacted a second time by an interviewer who would collect detailed information about job titles and competencies for the purpose of establishing educational training programs.

Following the suggestions given by the advisory group a sample instrument was prepared and returned to the members for further review. The residual instrument was field tested in agri-businesses in the Bozeman area in an effort to eliminate ambiguous and poorly worded statements. The responses to the questionnaire indicated it was still too lengthy and required too much of the employers time to complete.

The final Montana Agricultural Occupational Opportunities survey which evolved as a result of additional staff conferences was printed on a four inch by nine inch double fold mailback card. A space was provided on the card for the computer printed address label so the address would be visible through the window of an envelope. The return address was printed on the

back side of the card along with a first class mailing permit. When the respondent had completed the card, it could be folded, sealed with a gummed sticker and returned to Montana State University. (Appendix D)

The agri-businesses contacted were asked to classify themselves according to six of the seven U.S.O.E. codes and titles classifications for agriculture including:

1. agricultural supplies and services,
2. agricultural mechanics,
3. agricultural products,
4. ornamental horticulture,
5. agricultural resources, or
6. forestry.

A cover letter was prepared and sent with each questionnaire. The letter explained the need for the survey and requested assistance in obtaining the necessary data. In addition to the cover letter, each employer received a list of terms and their definitions to further clarify the survey instrument. (Appendices D and E)

CONDUCTING THE AGRI-BUSINESS SURVEY

The first mailing consisted of 2,213 surveys to agri-businesses throughout the state. In an effort to expedite the return of the survey instruments representatives from certain grain and milling firms-specifically the Grain Terminal Association, Farmers Union Central Exchange Inc. and Peavey Company offered to send questionnaires to those agri-businesses that were members of the respective associations. The representatives mailed the surveys and the accompaning instructions to their association members with a personal note requesting their participation.

Three weeks were allowed for the surveys to be returned. During this time, preparations were made for a second mailing. This was sent to approximately 1,700 who had not responded to the first mailing. At the time of the second mailing, vocational agriculture instructors, company representatives and others who had agreed to help were requested to assist in promoting the return of surveys through personal contact. (Appendix F)

Even though the survey had been refined, field tested and simplified, numerous incomplete surveys were returned. In many cases it was an obvious oversight on the part of the respondent. Where feasible, incomplete surveys were returned to an agricultural teacher or company representative for completion.

To gather additional returns an interviewer spent one week in Great Falls and in Billings personally interviewing a sample of agri-businesses who had not replied to the mailed survey. The technique proved to be quite costly.

The interviewer received an allowance for mileage and room as well as $3.50 per hour for the hours spent administering the survey instrument. A total of $217.00 was spent on wages and $175.00 was spent on mileage and rooms during the two week period. In 62 hours the interviewer completed an additional 98 surveys at a total cost of $3.95 per survey.

FOLLOW-UP OF NONRESPONDENTS

A plan was developed to follow-up a sample of those businesses who had not responded to the Montana Employment Opportunity Survey. Fifty-seven percent of the agri-businesses responded to the survey as result of a first and second mailing and personal contacts. A decision was made to follow-up approximately 25 percent of those who had failed to return the initial survey.

Prior to drawing the sample, the list of agri-businesses who had not responded was reviewed to insure that there would be no duplication and that those contacted would in fact be non-respondents. A table of random numbers was used to select a sample of three hundred from the non-respondent group. Approximately 100 of those drawn were in communities in which there was a vocational agriculture department. The names of the businesses, survey instruments and a letter requesting the agricultural instructor to contact the business and complete the survey were forwarded to the respective communities.

The remaining 200 agri-businessmen were contacted by use of a separate Centrex telephone line placed in the Agricultural Education Department. An interviewer familiar with the project, was employed to call each businessman and attempt to complete the survey instrument. A total of 265 instruments were completed using both methods of follow-up.

Economically the Centrex line with a trained interviewer proved to be an efficient means of gathering employment data. The same interviewer who had interviewed in the Billings and Great Falls areas conducted the telephone interviews. A breakdown of the costs for the follow-up of nonrespondents was as follows:

Selecting a random sample, 24 hrs. @ $3.50/hr.	= $ 84.00
Calling agri-businesses, 80 hrs. @ $3.50/hr.	= 280.00
Centrex telephone line charge	= 163.00
Total	= $527.00

Two hundred (200) interviews were conducted via the Centrex line at a cost of $2.63 per survey. This compared with a cost of $3.95 per survey using a personal interview technique.

ANALYSIS AND PRESENTATION OF THE DATA

The data from all valid survey instruments resulting from the initial mailing were coded and delivered to the Computer Section of the Research, Planning, Development and Evaluation Unit of the Office of Superintendent of Public Instruction for keypunching and subsequent computer analysis. The data were arrayed in a numerical fashion to enable researchers to account for current and predicted vacancies in each of six U.S.O.E. Classifications and eight job positions. (Appendix G) The complete results of the agri-business survey are reported in the Agricultural Production Manpower Report prepared by the Department of Agricultural Education.

The data gathered from the follow-up of 265 agri-businesses which had not replied to the survey were tabulated in the same manner as data generated by the initial responses (Appendix H). All data were then compiled into one table (Appendix I).

In an effort to make the report more meaningful, the data were arrayed in a number of smaller tables according to each job classification within the six U.S.O.E. Classifications. For example, all employment figures relating to managerial positions in all six classifications were placed in a separate table.

Each table contained information on the present employment level, current vacancies, predicted employment one year and three years hence. In addition to the actual figures, percentages were determined to show expected increases or decreases from the present level of employment.

Two groups of data were presented. The first and most detailed data presented were data collected from the 1,045 usable surveys. The summary of findings and conclusions included in the manpower report were based on this data.

A population of 2,213 agri-businesses was identified in Montana. All efforts to solicite responses resulted in usable returns from 1,045 businesses, 45 percent of the entire population.

It was felt that some effort should be made to project employment needs and anticipated opportunities to the entire population. The process of projecting to the total survey population of 2,213 agri-businesses was complicated by the fact that agri-businesses, when surveyed, placed themselves in one of six U.S.O.E. Classifications. Therefore, when identifying the population no effort was made to categorize each business. Because of the procedure followed, it was impossible to assertain exactly how many of the agri-businesses not responding were in each of the agri-business classifications.

The employment figures shown in (Appendix J) resulted from the application of a ratio-proportion procedure based on 1,045 usable returns, thus, the second set of data represent an estimate of the total population. Because every effort was made to maintain randomization throughout the study it was felt that such a projection would represent a reasonable estimate of the total employment picture among Montana's agri-businesses.

MAJOR CONCLUSIONS

For the first time, as a result of the completion of Phase I-A of the manpower survey, a population of agri-businesses has been identified from

which a sample may be drawn to further define job titles, job clusters and identify specific job competencies. To date such a representative group had not been identified.

The procedure outlined herein describes the statewide effort which was made to develop an economical, efficient and effective method of assessing Montana's current and anticipated agri-business employment opportunities.

This census of agri-business employment opportunities will provide a partial basis upon which to determine the allocation of resources to agricultural instruction. A further analysis of the projections should give some indication of the appropriate character and content of the instruction.

RECOMMENDATIONS

The object of Phase I-A of the manpower survey was to assess current and anticipated employment opportunities. Based on the experience gained in developing and using the procedure described, the following recommendations are made:

1. The procedure followed in identifying employment opportunities among specific businesses in agriculture should be further refined and used as a method to collect employment data relevant to other areas of vocational education.

2. Funds should be made available to maintain an up-to-date file on agri-business employment opportunities in Montana.

3. The question asking agri-business employers to specify the amount of income derived from one or more of the six business classifications seemed to be confusing. Consideration should be given to changing or modifying the technique used to obtain this information.

4. The use of the telephone to follow-up non-respondents showed great promise. In the future, the telephone should be given further consideration as a method of obtaining and up-dating agri-business employment information.

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APPENDIX A

THE PHASES OF THE AGRI-BUSINESS SURVEY

Phases of the Agri-Business Survey

Phase I-A - - - The Agri-Business Survey

Duration: June 1, 1971 to June 30, 1972

Activities:

1. Determine the population of Montana Agri-businesses
2. Develop survey instrument
3. Print questionnaire
4. Enter agri-business firms on IBM cards
5. Survey agri-businesses by mail
6. Follow-up of agri-businesses survey by mail
7. Follow-up of agri-businesses survey by personal interview
8. Computer analysis of data
9. Preparation of final report
10. Print 300 final reports

Phase I-B - - - The Agri-Business Survey

Duration: July 1, 1972 to June 30, 1973

Activities:

1. Design instrument to determine job titles and needed employee compentencies in accordance with the United States Office of Education (U.S.O.E.) Codes & Titles.
2. Print instruments
3. Train interviewers
4. Determine sample population
5. Interview Montana agri-businesses
6. Compile and process data from interviews
7. Preparation of final report
8. Publish study results

APPENDIX B

LETTER,
MONTANA STATE CHAMBER OF COMMERCE

Agri-Business Council
Montana Chamber of Commerce
Box 1730 Helena, Montana Phone 442-2405

At no place is there a compilation of all the agriculturally related business firms in the State of Montana.

This letter is to request your assistance in obtaining a list of such businesses in your community.

This office will be co-operating with the Division of Vocational Training of the Department of Public Instruction in conducting a survey of all ag-business firms in the state in an effort to determine their present manpower needs; planned personnel needs for the future; job categories; need for upgrading and retraining of present workers; salary information; and work and educational background needed by prospective employees.

The primary purpose of the survey will be to provide, through the post-seconday vocational technical centers, broader and more comprehensive agricultural and ag-business programs.

Will you please complete the enclosed form and return it as soon as possible?

Sincerely,

Wilbur F. McKinney
Staff Associate

WFM/bn

Enclosure

APPENDIX C

LETTER TO
MONTANA VOCATIONAL AGRICULTURE TEACHERS

STATE OF MONTANA

OFFICE OF THE STATE SUPERINTENDENT
HELENA 59601

DOLORES COLBURG
Superintendent of
Public Instruction

April 6, 1971

Dear

This office is cooperating with the agriculure committee of the Montana Chamber of Commerce in conducting a survey of all ag-business firms in the state in an effort to determine their present manpower needs; planned personnel needs for the future; job categories; need for upgrading and retraining of present workers; salary information; and work and educational background needed by prospective employees.

Since there is no compilation of all the agriculturally-related business firms in the State of Montana, this letter is to request your assistance in obtaining a list of such businesses in your community and in neighboring towns.

The primary purpose of the survey is to provide, through the post-secondary vocational-technical centers, broader and more comprehensive agricultural and ag-business programs.

Will you please complete the enclosed sheet and return as soon as possible? Thank you for your help.

Sincerely,

Basil C. Ashcraft
Supervisor, Agriculture Education

BCA:fg

Enc.

AG-RELATED BUSINESS FIRMS

Town _____

Name of Ag-Business Firm	Primary Business	Owner or Manager	Address

APPENDIX D

A. COVER LETTER
B. SURVEY INSTRUMENT

—Montana State University—

Bozeman, Montana 59715 Tel. 406-587-3121

Department of Agricultural Education
College of Agriculture

Montana State University, The Montana Chamber of Commerce and The Office of the State Superintendent of Public Instruction are currently engaged in a state-wide study. Results will help to determine specific facts relating to present and projected agriculturally related job opportunities in Montana.

Because of the importance placed upon this information, we are enclosing an additional questionnaire for your completion. Your assistance is extremely important. This is especially true as project guidelines are now being established. Your return will help provide the direction we must have for effective planning.

Should you have already completed and mailed your reply, please disregard this mailing.

Thank you for your assistance.

Sincerely,

Mr. Basil C. Ashcraft, Supervisor
Agricultural Education
Office of the State Superintendent
of Public Instruction

Dr. Max L. Amberson, Head
Agricultural Education
Montana State University

BCA/MLA:eb
Enclosures

MONTANA AGRICULTURAL OCCUPATIONAL OPPORTUNITIES

Please indicate the percent of your business which is derived from one or more of the following areas:

____ Ag. Supplies/Services: Furnishing production supplies to farmers and provide services needed to utilize these supplies.
____ Ag. Mechanics: Sale and service of agricultural power units, machinery and related equipment.
____ Ag. Products: Assembling, sorting, testing, grading, storing and marketing farm and ranch products.
____ Ornamental Horticulture: Producing, distributing and utilizing horticultural plants.
____ Ag. Resources: Conservation and improvement of natural resources.
____ Forestry: Management of trees, forest protection, logging and wood utilization.

Should any of your employees have agricultural experience to be satisfactorly employed? Yes__ No__

Number of employees currently employed. ____

Estimated percent of gross income from Ag. Sales or Service. ____

Are there job vacancies in your business? Yes__No__

Please indicate why these vacancies exist:
__Business expansion
__Retirement
__Normal turnover
____Business merger
____Implementing additional service
____Trained employees not available

Please complete the following by placing the number of employees in the appropriate space provided. For each employee select the position which most nearly describes the nature of his work.

Positions	Ag. Supplies/Services [1]				Ag. Mechanics [2]				Ag. Products [3]				Ornamental Horticulture [4]				Ag. Resources [5]				Forestry [6]			
	E	V	1	3	E	V	1	3	E	V	1	3	E	V	1	3	E	V	1	3	E	V	1	3
Managerial																								
Supervisory																								
Technical																								
Sales																								
Office																								
Service																								
Skilled																								
Unskilled																								

E=No. of employees currently on the job
V=Current job vacancies
1=Expected no. of employees on the job one year from now
3=Expected no. of employees on the job three years from now

First
Class
Permit No. 69
Bozeman
Montana

BUSINESS REPLY MAIL
no postage necessary if mailed in the USA

AGRICULTURAL EDUCATION DEPARTMENT

MONTANA STATE UNIVERSITY

BOZEMAN, MONTANA 59715

REF: 1-6331-090

35

40

APPENDIX E

DEFINITION OF TERMS

Definitions of Terms For Agri-business Survey

Please determine under which of the six following areas your business is represented and indicate the percentage of each area on the provided form.

Ag Supplies/Services: Those businesses which provide supplies to farmers and ranchers and provide services needed to utilize these supplies. (e.g., Hardware, Feed Store, Fertilizer Plant)

Ag Mechanics: Bussinesses which sell and service agricultural power units, machinery and related equipment. (e.g., Farm Implement Dealer, Agricultural Mechanic Shop)

Ag Products: Businesses which assemble, sort, test, grade, store, and market farm and ranch products. (e.g., Elevator, Feed Mill, Dairy Processing Plant)

Ornamental Horticulture: Businesses which produce, distribute, and utilize ornamental crops prinicpally for ornamental or aesthetic purposes. (e.g., Nursery, Landscaping, Lawn and Turf Management)

Ag Resources: Businesses concerned with the principles and practices necessary to conserve and improve our natural resources. (e.g., ASCS, SCS, FHA, Banks)

Forestry: Businesses involved in the production, processing, management, marketing, and utilization of forest products. (e.g., Tree Farm, Sawmill, Wood Product Plant)

Definitions to aid in separating employees by areas.

Managerial: Individuals responsible for the overall direction of the business and its goals. (e.g., General Managers)

Supervisor: Individuals who have the responsibility of supervising tasks completed by others. (e.g., Area Supervisor, Shop Foreman, Farm Loan Officer)

Technical: Individuals capable of performing duties and/or services which require a knowledge of science, mathematics, manufacturing and constructing process. (e.g., Surveyor, Soil Conservationist)

Sales: Individuals who perform the sales function within the business and who might travel to the consumer to provide other needed related functions. (e.g., Salesman)

Office: Individuals responsible for the business's paper work and communications. (e.g., Typists, Clerks, Receptionists)

Service: Individuals who deliver, setup, demonstrate, maintain and/or do major repairs upon the products handled by the business. (e.g., Partsmen, Welders, Mechanics)

Skilled: Individuals who perform certain manipulative operations beyond that required by a laborer or beginning apprentice connected with a given trade. (e.g., Electrician, Painter)

Unskilled: Individuals who perform tasks for which there is little need for previous educational training. (e.g., Cleaning, Minor Servicing, Hauling, Delivery, Light Truck Drivers)

APPENDIX F

FOLLOW-UP LETTER

—Montana State University—

Bozeman, Montana 59715 Tel. 406 587-3121

Department of Agricultural Education
College of Agriculture

As you know the Department of Agricultural Education in cooperation with the Office of Public Instruction Division of Vocational Education is attempting to identify the extent and nature of agri-business employment opportunities in Montana. You will recall that you supplied many of the names of businesses included in this study. The first returns are in and the data is being analyzed.

About 40 percent of the businesses contacted have responded to our questionnaire. However, we would like to include information from a sample of those businesses in your community that did not respond in order to verify the data already received. Additional inquiries are being made by phone in those areas not served by vocational agricultural departments.

Because of your interest in developing meaningful programs of vocational agriculture in Montana, I am requesting your help. I have enclosed questionnaires for businesses in your community. The questionnaire requires about 10 minutes to complete.

I realize we are asking for time out of a very busy schedule but the information is vital to the development of future programs to meet the needs of your students at the high school and post secondary level. Would you please contact these businesses, complete the form with them and return the completed questionnaire to this office as soon as possible.

It is essential that we have data about the businesses in your community. If it is impossible for you to help us obtain the data within the next two weeks return the questionnaires to us.

Sincerely,

Dr. Douglas D. Bishop
Assistant Professor

DDB:eb
Enclosures

APPENDIX G

SUMMARY OF DATA FROM 780 RESPONDENTS

MONTANA AGRICULTURAL OCCUPATIONAL OPPORTUNITIES CATEGORIZED
BY USOE CLASSIFICATIONS AND SKILL LEVELS

N=780

Positions	Ag Supplies/Service				Ag Mechanics				Ag Products			
	E	V	1	3	E	V	1	3	E	V	1	3
Managerial	504	13	484	494	131	7	131	131	142	4	152	158
Supervisory	297	7	296	312	57	5	64	71	77	3	84	93
Technical	133	10	141	157	44	9	48	50	56	3	46	49
Sales	551	32	587	650	145	15	169	186	148	4	155	164
Office	560	12	535	550	111	1	115	119	194	4	197	203
Service	416	17	405	432	415	33	478	517	103	8	108	120
Skilled	479	21	464	488	98	16	126	145	497	7	517	524
Unskilled	478	15	520	537	41	4	43	50	434	13	428	436
Totals	3418	127	3432	3620	1042	90	1174	1269	1641	46	1687	1747
Occurrences	1440		1400	1398	447		450	451	389		395	398

	Orn. Hort.				Ag. Resources				Forestry			
	E	V	1	3	E	V	1	3	E	V	1	3
Managerial	12	0	12	12	122	1	105	105	35	0	37	36
Supervisory	2	1	2	2	101	1	65	67	51	1	52	54
Technical	1	1	1	1	310	8	266	266	10	0	10	12
Sales	8	0	8	9	4	0	3	3	26	0	27	30
Office	5	0	5	5	346	2	264	280	49	0	52	54
Service	0	0	1	2	118	0	93	123	103	6	110	115
Skilled	6	3	11	13	47	1	30	39	248	12	311	293
Unskilled	24	0	24	24	22	0	30	39	203	7	275	257
Totals	58	5	64	68	1070	13	856	922	725	26	874	851
Occurrences	27		30	30	114		107	106	118		120	110

APPENDIX H

SUMMARY OF FOLLOW-UP DATA FROM 265 RESPONDENTS

SUMMARIZATION OF FOLLOW-UP OF NON-RESPONDENTS

N=265

Position	Ag Supplies/Services				Ag Mechanics				Ag Products			
	E	V	1	3	E	V	1	3	E	V	1	3
Managerial	132	1	132	133	23	0	23	23	29	0	28	29
Supervisory	13	0	13	13	4	0	4	4	7	1	9	10
Technical	3	1	4	4	0	0	0	0	1	0	1	1
Sales	46	3	50	52	15	0	16	18	8	1	9	9
Office	75	2	77	80	15	2	17	18	22	1	23	23
Service	129	4	147	142	62	8	72	63	55	3	57	57
Skilled	77	10	78	79	13	1	14	14	53	1	57	59
Unskilled	103	2	112	113	6	0	6	6	73	2	78	79
Totals	578	23	613	616	138	11	152	146	248	9	262	267
Occurrances	321	15	321	323	78	9	78	78	100	8	100	101

Position	Orn. Horticulture				Ag Resources				Forestry			
	E	V	1	3	E	V	1	3	E	V	1	3
Managerial												
Managerial	4	0	4	4	34	1	37	38	1	0	1	1
Supervisory	0	0	0	0	11	0	11	13	0	0	0	0
Technical	5	0	5	5	1	0	1	2	0	0	0	0
Sales	-	0	0	0	0	0	0	0	0	0	0	0
Office	2	0	2	2	34	1	39	41	1	0	1	1
Service	1	0	1	1	33	0	36	39	0	0	0	0
Skilled	3	0	3	3	0	0	0	0	18	0	18	18
Unskilled	2	0	2	2	2	0	2	2	2	0	2	2
Totals	17	0	17	17	115	2	126	135	22	0	22	22
Occurrances	11	0	11	11	41	2	41	41	3	0	3	3

APPENDIX I

SUMMARY OF DATA FROM 1,045 RESPONDENTS

MONTANA AGRICULTURAL OCCUPATIONAL OPPORTUNITIES CATEGORIZED
BY USOE CLASSIFICATIONS AND SKILL LEVELS

N=1,045

Positions	Ag Supplies/Service				Ag Mechanics				Ag Products			
	E	V	1	3	E	V	1	3	E	V	1	3
Managerial	636	14	616	627	154	7	154	154	171	4	180	187
Supervisory	310	7	309	325	61	5	68	75	84	4	93	103
Technical	136	11	145	161	44	9	48	50	47	3	47	50
Sales	597	35	637	702	160	15	185	204	156	5	164	173
Office	635	14	612	630	126	3	132	137	216	5	220	226
Service	545	21	552	574	477	41	550	580	158	11	165	177
Skilled	556	31	542	567	111	17	140	159	550	8	574	583
Unskilled	581	17	623	650	47	4	49	56	507	15	506	515
Totals	3996	150	4036	4236	1180	101	1326	1415	1889	55	1949	2014

Positions	Orn. Horticulture				Ag Resources				Forestry			
	E	V	1	3	E	V	1	3	E	V	1	3
Managerial	16	0	16	16	156	2	142	143	36	0	38	37
Supervisory	2	1	2	2	112	1	76	80	51	1	52	54
Technical	6	1	6	6	311	8	267	268	10	0	10	12
Sales	8	0	8	9	4	0	3	3	26	0	27	30
Office	7	0	7	7	380	3	303	321	50	0	53	55
Service	1	0	2	3	151	0	129	162	103	6	110	115
Skilled	9	3	14	16	47	1	30	39	261	12	329	311
Unskilled	26	0	26	26	24	0	32	41	205	7	277	259
Totals	75	5	81	85	1185	15	982	1057	742	26	896	873

APPENDIX J

PROJECTED EMPLOYMENT DATA

MONTANA AGRICULTURAL OCCUPATIONAL OPPORTUNITIES CATEGORIZED
BY USOE CLASSIFICATIONS AND SKILL LEVELS
PROJECTED TO THE TOTAL POPULATION

N=2213

	Ag Supplies/Services				Ag Mechanics				Ag Products			
	E	V	1	3	E	V	1	3	E	V	1	3
Managerial	1347	30	1304	1328	326	15	326	326	326	8	382	396
Supervisory	656	13	654	667	129	11	144	159	178	8	193	218
Technical	288	23	307	340	93	19	102	106	100	6	100	106
Sales	1264	74	1349	1486	339	32	391	432	331	11	348	367
Office	1345	30	1295	1334	267	6	279	290	458	10	466	479
Service	1154	44	1169	1215	1009	87	1164	1227	335	23	350	375
Skilled	1177	65	1148	1201	235	36	296	336	1166	17	1217	1236
Unskilled	1230	34	1319	1376	99	8	104	118	1075	32	2073	1092
Total	8461	313	8545	8947	2497	214	2806	2994	3969	115	5129	4269

	Orn. Horticulture				Ag Resources				Forestry			
	E	V	1	3	E	V	1	3	E	V	1	3
Managerial	34	0	34	34	331	4	301	303	76	0	80	78
Supervisory	4	2	4	4	237	2	161	170	107	2	109	114
Technical	13	2	13	13	659	17	566	568	21	0	21	25
Sales	17	0	17	19	8	0	6	6	55	0	57	63
Office	15	0	15	15	653	6	642	680	105	0	112	116
Service	2	0	4	6	320	0	273	343	217	13	232	242
Skilled	19	6	30	34	100	2	64	83	549	25	693	655
Unskilled	56	0	56	56	51	0	68	87	432	15	583	545
Total	160	10	173	181	2359	31	2081	2240	1562	55	1887	1838